



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, CA 92037

26 April 2006

CRUISE REPORT

VESSEL: NOAA Ship *David Starr Jordan*

CRUISE NUMBER: DS-05-07, Southwest Fisheries Science Center Cruise Number: 1628

CRUISE DATES: 01 August to 07 December 2005

PROJECT: Collaborative Survey of Cetacean Abundance and the Pelagic Ecosystem (CSCAPE 2005)

STUDY AREA: United States West Coast waters

The principal study area included the U.S. West Coast Exclusive Economic Zone (EEZ) – Washington, Oregon, and California coastal waters out to a distance of approximately 300 nautical miles. The survey was divided into two sampling strata: 1) a grid of predetermined tracklines to obtain coarse coverage of the entire study area, 2) a separate set of parallel or zigzag lines to obtain finer-scale coverage within waters of four West Coast National Marine Sanctuaries.

ITINERARY: The Cscape project was divided into 8 legs. Legs 1a and 1b aboard NOAA Ship *McArthur II* are covered in a separate cruise report. Legs 2 through 7 were conducted aboard NOAA Ship *David Starr Jordan*.

Legs completed aboard NOAA Ship *David Starr Jordan* include:

Leg 2 – Depart: 01 Aug, San Diego, CA	Arrive: 18 August, Newport, OR
Leg 3 – Depart: 21 August, Newport, OR	Arrive: 09 September, Eureka, CA
Leg 4 – Depart: 12 September, Eureka, OR	Arrive: 01 October, San Diego
Leg 5 – Depart: 05 October, San Diego, CA	Arrive: 24 October, Astoria, OR
Leg 6 – Depart: 29 October, Astoria, OR	Arrive: 15 November, San Francisco, CA
Leg 7 – Depart: 18 November, San Francisco, CA	Arrive: 07 December, San Diego, CA

SPONSORING INSTITUTIONS: Protected Resources Division, Southwest Fisheries Science Center, (NMFS, NOAA); Olympic Coast National Marine Sanctuary, Cordell Banks National Marine Sanctuary, Gulf of the Farallones National Marine Sanctuary and Monterey Bay National Marine Sanctuary (NOS, NOAA), and the Sanctuary Integrated Monitoring Network (SIMoN).



CRUISE DESCRIPTION AND OBJECTIVES: The CSCAPE 2005 cruise was a collaboration between the National Marine Fisheries Service and the National Marine Sanctuary Program to assess the abundance and distribution of marine mammals and to characterize the pelagic ecosystem off the U.S. West Coast. The primary objective was to conduct a marine mammal assessment survey out to a distance of approximately 300 nautical miles, with additional fine-scale surveys within the NMS boundaries. A secondary objective was to characterize the pelagic ecosystem within the study area, through the collection of underway and station-based physical and biological oceanographic sampling, studies of mid-trophic level organisms (using net sampling and acoustic backscatter methods) and research on non-protected apex predators (seabirds). A final objective was to conduct biopsy sampling and photo-identification studies of cetacean species of special interest.

CHIEF SCIENTIST: Dr. Karin Forney, SWFSC (831) 420-3908

1.0 PROCEDURES FOR DAYLIGHT OPERATIONS

1.1 Cetacean Survey - Line-transect survey methods were used to collect abundance data. Search effort started on the trackline at the beginning of each day. NOAA Ship *David Starr Jordan* traveled at 10 knots (through the water) along the designated trackline. If the ship's speed through the water deviated from this by more than one knot while on search effort, the bridge personnel notified the mammal team on watch or the Cruise Leader. A daily watch for cetaceans was maintained on the flying bridge during daylight hours (approximately 0600 to 1900) by 6 mammal observers. Each observer worked in 2-hour rotations, manning each of the following 3 stations on the flying bridge for 40 minutes: a port side 25x150 binocular station, a center-line data recorder position, and a starboard 25x150 binocular station. An "independent observer" kept a separate watch of animals sighted during the cetacean survey operations, to be compared later with the observer team's data.

1.1.1 Logging of Data - Observation conditions, watch effort, sightings and other required information were entered into a computer, hooked up to the ship's Global Positioning System (GPS; course, speed and position information) and Scientific Computing System (SCS; weather and heading information). All science computers were connected to the same ship's GPS.

1.1.2 Breaking Trackline - On sighting cetaceans or other feature of biological interest, the Cruise Leader or marine mammal observer team on watch requested that the vessel be maneuvered to approach the school or feature for investigation. When the ship approached a group of cetaceans, the observers made independent estimates of school size. Biopsy and photographic operations commenced from the bow, based on directions from the Cruise Leader or Senior Marine Mammal Observers. In some instances, the Cruise Leader requested the deployment of a small boat for biopsy, photographic or other operations (see 1.3). Occasionally it was necessary to divert the ship's course from the established trackline during regular effort due to glare or adverse sea conditions. Under these circumstances, the ship was diverted up to 30 degrees from the established course. This deviation continued until the ship was 5 nautical miles from the trackline, at which point, the ship turned back toward the trackline.

1.1.3 Resuming Effort - When the observers completed scientific operations for the sighting, the ship resumed the same course and speed as prior to the sighting. If the pursuit of the sighting took the ship more than 5 nautical miles from the trackline, the observers were notified. The Cruise Leader or Senior Marine Mammal Observers infrequently requested that, rather than proceeding directly toward the next waypoint, the ship take a heading of 20 degrees back toward the trackline.

1.2 Seabird Survey - Visual surveys of seabirds were conducted from the flying bridge during daylight hours by two seabird observers. A log of sighting conditions, effort, sightings and other required information

was entered into a computer interfaced with the ship's GPS (for course, speed and position information) and SCS (for weather and heading information). All science computers were connected to the same ship's GPS. Seabird observers used handheld and 25x150 binoculars.

1.3 Small Boat Work - A small boat was frequently required for biopsy sampling or photography. Deployment was requested by the Cruise Leader on an opportunistic basis during all daylight hours, sometimes multiple times in a single day, providing the Commanding Officer concurred that operating conditions were safe. Unless the Commanding Officer allowed otherwise, the small boat remained within sight and radio contact at all times while deployed. With the exception of the small boat and safety gear, all necessary gear was furnished and operated by the scientific party.

1.4 Biopsy Sampling - Biopsy samples for genetic analyses of cetaceans were collected frequently on this survey. Necessary permits were present on the vessel. The animals sampled were approached by the research vessel during normal survey operations, approached the vessel on their own, or were approached by a small boat. Samples were collected using a dart fired from a crossbow or rifle when the animals were within 10 to 30 m of the bow of the vessels. With the exception of the small boat and safety gear, all necessary gear was furnished and operated by the scientific party.

1.5 Photography - Photographs of cetaceans were taken frequently on this survey. Necessary permits were present on the vessel. The animals to be photographed were approached by the research vessel during normal survey operations, approached the vessel on their own, or were approached by a small boat. With the exception of the small boat and safety apparel, all necessary gear was furnished by the scientific party.

1.6 Collection of Fish - Fish were collected on an opportunistic basis at the discretion of the Cruise Leader. Trolling gear was used underway when conditions permitted. While stationary, hook-and-line gear was used. Fish were measured, sexed, and stomach contents were examined and recorded by scientific personnel. The Cruise Leader was responsible for the disposition of the catch, in accordance with NOAA Administrative Order 202-735B, dated January 9, 1989.

1.7 Collection of Jellyfish Samples – Jellyfish and other gelatinous plankton were collected for leatherback turtle dietary studies. Jellyfish were collected using dip nets, during scheduled bongo tows or from the small boat. Samples were frozen for future stable isotopic analysis.

1.8 Salvage of Marine Mammals and Birds – Permits to salvage and import cetacean and bird parts were present on the vessel; however, no cetaceans or birds were salvaged during this cruise.

1.9 Acoustics -The scientific EK-500 depth sounder was operated at 38 and 200 KHz and interfaced to a data acquisition system to estimate micronekton biomass between 0 and 500 m. The vessel's EQ-50 depth sounder normally remained off while underway. The ship informed the Cruise Leader of any use of the vessel's EQ-50, as it interfered with the signals received on the scientific EK-500.

1.9.1 ADCP - The ship's ADCP ran continuously and was logged to a data acquisition system. Complete system settings were provided by the oceanographer, but included 5-minute averaging of currents, AGC and 4 beam returns in 60 8-meter bins.

1.9.2 Sonobuoys - Sonobuoys were deployed periodically from either NOAA Ship *David Starr Jordan* or a small boat on an opportunistic basis, at the discretion of the Cruise Leader. With the exception of the small boat, all of the necessary equipment was supplied and operated by scientific personnel.

1.9.3 Bow Hydrophone - A hydrophone mounted on the bow was activated by scientific personnel at the discretion of the Cruise Leader. All of the necessary equipment was supplied and operated by scientific personnel.

1.10 Oceanography - Oceanographic sampling was done by the oceanographers and other designated scientists, while underway.

1.10.1 XBT Drops - There were three XBT drops per day, at 0900, 1200 and 1500 hours local ship time, or as requested by the Cruise Leader. The XBTs were conducted and provided by scientific personnel. If the vessel was stopped at the scheduled launch time, the drop was delayed until the ship was underway again. If the vessel did not move within half an hour, the scientist performing the drop was notified and the drop was delayed or canceled, at the discretion of the Cruise Leader.

1.10.2 Surface Water Samples - A surface water sample for chlorophyll *a* analysis and a bucket temperature were taken at 0900, 1200, 1500 and 1800 hours local ship time daily, or as requested by the Cruise Leader.

1.10.3 Thermosalinograph Sampling - The ship provided and maintained a thermosalinograph (TSG), which was calibrated and in working order, for continuous measurement of surface water temperature and salinity. A backup unit (calibrated and in working order) was also provided by the vessel and remained aboard during the cruise. The Scientific Computing System (SCS) served as the main data collection system. The oceanographer provided the ship's Operations Officer and Electronics Technician with detailed SCS acquisition information before departure and a member of the scientific party sailing on the initial transit provided additional technical support. The SCS data acquisition was stopped and restarted weekly so the data files could be backed up and checked for errors. All SCS and SeaBird raw data was provided to the SWFSC oceanographer following each leg of the cruise.

1.10.4 Argo Buoy Deployments - Four Argo array buoys, part of the Global Climate Observing System/Global Ocean Observing System (GCOS/GOOS) and part of the Climate Variability and Predictability Experiment (CLIVAR) and the Global Ocean Data Assimilation Experiment (GODAE), were deployed by scientific personnel to help fill in the coverage gap off the western U.S. coast. Times and locations of deployment were determined by the Cruise Leader in consultation with the Command. Buoys were deployed off the stern by the scientific party after notifying the bridge.

2.0 PROCEDURES FOR NIGHT OPERATIONS

A chronological record of oceanographic and net tow stations was kept by the ship personnel (Marine Operations Log) with dates and times in GMT. The ship provided a copy of the electronic marine operations log (with the cruise Weather Log and SCS data) to the SWFSC oceanographer at the completion of the cruise. The main SeaBird CTD system was provided, maintained, and operated by the scientific party. The collection of oceanographic data, samples, and their processing was conducted by the scientific party. The crew of the vessel operated all deck equipment and was responsible for the termination (and any necessary reterminations) of the CTD cable pigtail (provided by the scientific party) to the conducting cable of the winch. The ship provided a complete backup system, consisting of a frame with weights, a 12-place rosette with bottles, a deck unit, and a SeaBird 9/11+ CTD with conductivity and temperature sensors. All instruments, their spares, and spare parts provided by the ship were maintained in working order and, if applicable, had current calibrations (within the previous 12 months).

2.1 CTD Stations - Weather permitting, between one and two CTD stations were occupied each night; an evening cast after the end of effort (unless the ship would resume effort within 10 nautical miles the next morning), and a pre-dawn cast. CTD data and seawater samples were collected using a SeaBird 9/11+ CTD with rosette (General Oceanic) and Niskin bottles fitted with silicone tubing and o-rings (supplied by oceanographer). All casts were to 1000m, with the descent rate at 30m/min for the first 100m of the cast, then 60m/min after that, including the upcast between bottles. From each cast, chlorophyll samples (to 200m) and salinity samples (500 and 1000m or bottom) were collected and processed on board. The 265ml chlorophyll samples were filtered onto GF/F filters, placed in 10ml of 90% acetone, refrigerated for 24 hours, and then analyzed on a Turner Designs model 10AU field fluorometer. Nutrient samples (0 - 500m) were collected, frozen, and stored on board. Cast times were subject to change because sunrise and sunset times varied during the cruise. Additional CTD stations were infrequently requested by the Cruise Leader in areas of special interest.

2.1.1 Pre-daylight Cast - The morning cast (1000m) began approximately one and one-half hours prior to sunrise. The exact starting time was determined the evening before, by the FOO or Deck Officer. The time did not change more than 15 minutes from the previous day, even if sunrise changed more than this. The schedule was infrequently modified by the oceanographer. Niskin bottle water samples were collected at seven light depths and five additional standard depths, between the surface and 1000m. These depths were determined just prior to each cast by entering the ship's position into a computer program. From each cast, chlorophyll samples (to 200m) and salinity samples (2 to 6 samples per cast, at least 500 and 1000m or bottom) were collected and processed on board. The 265ml chlorophyll samples were filtered onto GF/F filters, placed in 10ml of 90% acetone, refrigerated for 24 hours and then analyzed on a Turner Designs model 10AU field fluorometer. Nutrient samples (0-50m) were collected, frozen, and stored on board. Primary productivity was measured by radioactively labeled carbon uptake methods. Seven samples taken from Niskin bottles #1 through #7 were spiked with ^{14}C , incubated on deck for 24 hours, filtered, and stored for later analysis at the SWFSC. The Niskin bottles (#1-7) were rinsed after each cast and acid-washed at the end of each leg. In San Diego, the oceanographers were trained by SWFSC personnel in the use of radioactive material prior to departure. A copy of the SWFSC's NRC license for the use of radioisotopes was kept on board. All radioactive waste were stored in secured drums and boxes, and returned to San Diego (i.e. no disposal of radioactive material at sea).

2.1.2 Post Effort Cast - An evening CTD cast, to 1000m was conducted after effort if the ship would move less than 10 nautical miles overnight. The exact time was determined by the Deck Officer (by 1800 local ship time that day). Bottle samples were collected from 12 standard depths (0, 20, 40, 60, 80, 100, 120, 140, 170, 200, 500, 1000m). Samples for chlorophyll, nutrients and salts were taken as listed above (except the addition of four salinity samples taken from every other evening cast).

2.2 Net Sampling - Net tows were conducted by the scientific party with the assistance of a winch operator from the vessel.

2.2.1 Bongo Tow - An oblique bongo tow was conducted after the evening CTD in darkness, or if no evening CTD was conducted, the tow occurred a minimum of one hour after sunset. Both nets were 505 micron mesh and were towed for 15 minutes (45 minute station time), to a depth of 200 m (wire out 300m on starboard hydro winch). The samples were preserved in formalin or frozen (isotope analysis), labeled, and stored in containers provided by the SWFSC until the vessel returned to San Diego. The second cod end of the bongo (port side) was attached once per week or as requested by the Cruise Leader for isotope samples.

2.2.1.1 Samples for Leatherback Turtle Diet Isotope Project - The gelatinous contents of the second cod end of the bongo were placed in whirl-packs, labeled, and stored frozen for later stable

isotopic analysis. J. Seminoff (SWFSC) provided supplies to label and store these samples.

2.3 Transit - When scientific operations were complete for the night, the ship resumed course and proceeded along the trackline, until it was necessary to stop and position the ship for the morning (pre-daylight) CTD station. The ship transited between five and 100 nautical miles per night.

3.0 SCIENTIFIC PERSONNEL

3.1 Chief Scientist - The Chief Scientist was Dr. Karin Forney, SWFSC.

3.2 Participating Scientists -

David Starr Jordan - Leg 2: San Diego, CA to Newport, OR

Position	Name	Affiliation
Chief Scientist	Karin Forney	SWFSC
Senior Mammal Observer	Cornelia Oedekoven	AFL
Senior Mammal Observer	Gary Friedrichsen	AFL
Senior Mammal Observer	Annie Douglas	AFL
Mammal Observer	Holly Fearnbach	AFL
Mammal Observer	Laura Morse	AFL
Mammal Observer	Tim O'Toole	AFL
Independent Observer	Jason Larese	AFL
Seabird Observer	Peter Pyle	AFL
Seabird Observer	Thomas Staudt	AFL
Oceanographer	Liz Zele	AFL
Oceanographer	Candice Hall	AFL
Teacher-at-sea	Greta Lyons	NOAA Teacher-at-Sea

David Starr Jordan – Leg 3: Newport, OR to Eureka, OR

Position	Name	Affiliation
Chief Scientist	Susan Chivers	SWFSC
Senior Mammal Observer	Cornelia Oedekoven	AFL
Senior Mammal Observer	Gary Friedrichsen	AFL
Senior Mammal Observer	Annie Douglas	AFL
Mammal Observer	Holly Fearnbach	AFL
Mammal Observer	Laura Morse	AFL
Mammal Observer	Jim Gilpatrick	AFL
Independent Observer	Mari Rosales	AFL
Seabird Observer	Scott Mills	AFL
Seabird Observer	Thomas Staudt	AFL
Oceanographer	Liz Zele	AFL
Oceanographer	Candice Hall	AFL
Teacher-at-sea	Maureen Barrett	ARMADA Project

David Starr Jordan – Leg 4: Eureka, OR to San Diego, CA

Position	Name	Affiliation
Chief Scientist	Eric Archer	SWFSC
Senior Mammal Observer	Cornelia Oedekoven	AFL
Senior Mammal Observer	Gary Friedrichsen	AFL
Senior Mammal Observer	Annie Douglas	AFL
Mammal Observer	Holly Fearnbach	AFL
Mammal Observer	Laura Morse	AFL
Mammal Observer	Tim O'Toole	AFL
Independent Observer	Shawn Noren	NRC
Seabird Observer	Dawn Breese	AFL
Seabird Observer	Thomas Staudt	AFL
Oceanographer	Liz Zele	AFL
Oceanographer	Candice Hall	AFL
NMS Visiting Scientist	Jamie Hall	NMS
Visiting Scientist/Other	Gaby Serra-Valente	AFL

David Starr Jordan – Leg 5: San Diego, CA to Astoria, OR

Position	Name	Affiliation
Chief Scientist	Jim Carretta	SWFSC
Senior Mammal Observer	Cornelia Oedekoven	AFL
Senior Mammal Observer	Gary Friedrichsen	AFL
Senior Mammal Observer	Kathy Hough	AFL
Mammal Observer	Holly Fearnbach	AFL
Mammal Observer	Laura Morse	AFL
Mammal Observer	Tim O'Toole	AFL
Independent Observer	Paula Olson	AFL
Seabird Observer	Rich Pagen	AFL
Seabird Observer	Peter Pyle	AFL
Oceanographer	Liz Zele	AFL
Oceanographer	Candice Hall	AFL

David Starr Jordan – Leg 6: Astoria, OR to San Francisco, CA

Position	Name	Affiliation
Chief Scientist	Sarah Mesnick	SWFSC
Senior Mammal Observer	Cornelia Oedekoven	AFL
Senior Mammal Observer	Gary Friedrichsen	AFL
Senior Mammal Observer	Kathy Hough	AFL
Mammal Observer	Holly Fearnbach	AFL
Mammal Observer	Laura Morse	AFL
Mammal Observer	Jim Gilpatrick	SWFSC
Independent Observer	Natalie Spear	AFL
Seabird Observer	Rich Pagen	AFL
Seabird Observer	Thomas Staudt	AFL
Oceanographer	Liz Zele	AFL
Oceanographer	Candice Hall	AFL
Visiting Scientist/Other	Nicole Hedrick	AFL

David Starr Jordan – Leg 7: San Francisco, CA to San Diego, CA

Position	Name	Affiliation
Chief Scientist	Jessica Redfern	SWFSC
Senior Mammal Observer	Cornelia Oedekoven	AFL
Senior Mammal Observer	Gary Friedrichsen	AFL
Senior Mammal Observer	Kathy Hough	AFL
Mammal Observer	Holly Fearnbach	AFL
Mammal Observer	Laura Morse	AFL
Mammal Observer	Jim Gilpatrick	SWFSC
Independent Observer	Beth Phillips	MLML
Seabird Observer	Rich Pagen	AFL
Seabird Observer	Thomas Staudt	AFL
Oceanographer	Liz Zele	AFL
Oceanographer	Candice Hall	AFL
NMS Visiting Scientist	Shannon Lyday	NMS

Affiliation Acronyms

SWFSC	Southwest Fisheries Science Center
AFL	Aquatic Farms, Ltd.
ARMADA Project	The ARMADA Project provides scientific research and mentoring experiences for teachers.
NRC	National Research Council
NMS	National Marine Sanctuaries
MLM	Moss Landing Marine Laboratories

4.0 RESULTS

The following summarizes the area surveyed and the data collected:

Figure 1: Tracklines surveyed during CSCAPE 2005.

Table 1. Summary of the number of cetacean sightings aboard NOAA Ship *David Starr Jordan* during CSCAPE 2005, Legs 2-7.

Table 2. Number of cetacean biopsy samples collected during CSCAPE 2005, Legs 2-7.

Table 3. Preliminary estimates of the number of cetacean photographs obtained during CSCAPE 2005, Legs 2-7 (digital and some 35mm).

Table 4. Number of sonobuoys deployed to obtain acoustic recordings of cetaceans for each leg of the CSCAPE cruise.

Table 5. Summary of environmental data collected during CSCAPE 2005, Legs 2-7.

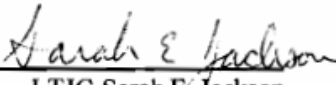
5.0 DISPOSITION OF DATA

All data are currently being analyzed. The final data reports will be completed by 31 December 2006

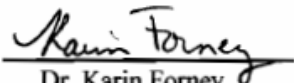
Marine Mammal and passive acoustic data were delivered to the Chief Scientist, Dr. Karin Forney, SWFSC, for analysis and distribution.

Biopsy samples were delivered to Dr. Barbara Taylor, SWFSC, for analysis and distribution.


Oceanographic data were delivered to Dr. Paul Fiedler, SWFSC, for analysis and distribution.

Prepared by: 
LTJG Sarah E. Jackson
Survey Coordinator, SWFSC

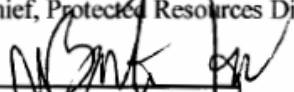
Dated: 4/27/2006


Dr. Karin Forney
Chief Scientist, SWFSC

Dated: 4/28/2006

Approved by: 
Dr. Stephen B. Reilly
Chief, Protected Resources Division

Dated: 5/3/2006

Approved by: 
Dr. William W. Fox, Jr.
Science Director, F/SWR

Dated: 5/6/06

Figure 1: Tracklines surveyed during the daylight hours of CSCAPE 2005. Tracklines for legs 2-7 are relevant to this cruise report.

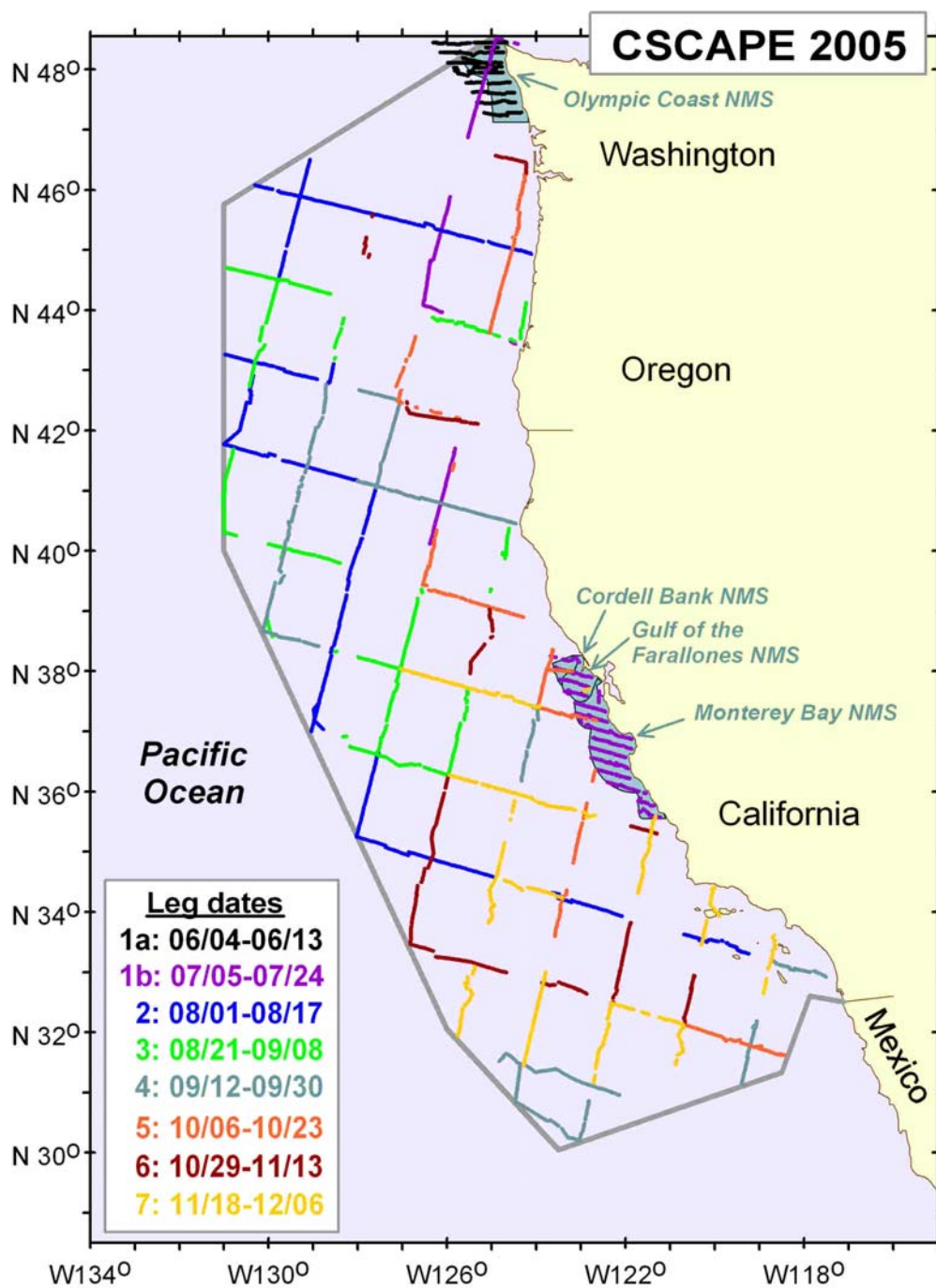


Table 1: Summary of CSCAPE 2005 marine mammal sightings aboard NOAA Ship *David Starr Jordan*. Mixed schools are counted once for each sighting category that occurs in them. School size is the mean of the best estimates of total school size for pure schools, and subgroup size of the sighting category in the case of mixed schools.

Code	Sighting Category	Pure Schools	Mixed Schools	Total Sightings	Average School Size
16	<i>Delphinus capensis</i>	0	6	6	87.4
17	<i>Delphinus delphis</i>	85	35	120	173.4
5	<i>Delphinus</i> sp.	5	3	8	114.4
36	<i>Globicephala macrorhynchus</i>	1	0	1	26.4
21	<i>Grampus griseus</i>	15	4	19	17
22	<i>Lagenorhynchus obliquidens</i>	2	6	8	38.3
27	<i>Lissodelphis borealis</i>	9	6	15	82.2
37	<i>Orcinus orca</i>	5	2	7	5
13	<i>Stenella coeruleoalba</i>	1	24	25	54.5
18	<i>Tursiops truncatus</i>	4	3	7	15.9
96	unid. cetacean	6	0	6	1.5
77	unid. dolphin	26	2	28	27.1
277	unid. medium delphinid	3	0	3	5.8
40	<i>Phocoena phocoena</i>	21	0	21	4
44	<i>Phocoenoides dalli</i>	94	3	97	4.7
477	unid. porpoise	1	0	1	2
71	<i>Balaenoptera acutorostrata</i>	8	0	8	1.3
73	<i>Balaenoptera borealis</i>	2	1	3	1.2
75	<i>Balaenoptera musculus</i>	36	6	42	1.4
74	<i>Balaenoptera physalus</i>	91	10	101	1.9
70	<i>Balaenoptera</i> sp.	45	4	49	1.2
63	<i>Berardius bairdii</i>	5	0	5	6.2
76	<i>Megaptera novaeangliae</i>	45	4	49	15.6
51	<i>Mesoplodon</i> sp.	1	0	1	2
46	<i>Physeter macrocephalus</i>	24	1	25	6.3
79	unid. large whale	16	2	18	1.3
78	unid. small whale	4	0	4	4
98	unid. whale	1	0	1	1
49	ziphiid whale	6	0	6	1.7
61	<i>Ziphius cavirostris</i>	3	0	3	2
CU	<i>Callorhinus ursinus</i>	33	0	33	1.4
EJ	<i>Eumetopias jubatus</i>	5	0	5	1.6
MA	<i>Mirounga angustirostris</i>	26	0	26	1
PV	<i>Phoca vitulina</i>	2	0	2	1
PU	unid. pinniped	7	0	7	1.3
UO	unid. sea lion	1	0	1	1
ZC	<i>Zalophus californianus</i>	57	0	57	2.6
TOTAL		696	122	818	34.9

Table 2. Number of cetacean biopsy samples collected during CSCAPE 2005 aboard NOAA Ship *David Starr Jordan*.

Scientific Name	# Biopsy Samples
<i>Stenella coeruleoalba</i>	4
<i>Delphinus delphis</i>	207
<i>Tursiops truncatus</i>	3
<i>Grampus griseus</i>	4
<i>Lagenorhynchus obliquidens</i>	9
<i>Lissodelphis borealis</i>	8
<i>Phocoenoides dalli</i>	13
<i>Berardius bairdii</i>	2
<i>Balaenoptera acutorostrata</i>	1
<i>Balaenoptera physalus</i>	1
<i>Balaenoptera musculus</i>	4
<i>Megaptera novaeangliae</i>	11
	267

Table 3. Preliminary estimates of the number of cetacean photographs obtained during CSCAPE 2005, aboard NOAA Ship *David Starr Jordan*. (digital and some 35 mm).

Species	Category	Leg 2	Leg 3	Leg 4	Leg 5	Leg 6	Leg 7	Total
	Catalogue-quality							
<i>Megaptera novaeangliae</i>	Flukes	0	4	7	7	1	10	29
<i>Balaenoptera musculus</i>	Dorsal	7	6	6	10	4	1	34
<i>Balaenoptera physalus</i>	Dorsal	8	13	3	9	2	0	35
<i>Physeter macrocephalus</i>	Fluke	3	2	1	0	0	0	6
<i>Orcinus orca</i>	Dorsal	0	8	0	4	9	0	21
	Groups							
<i>Lissodelphis borealis</i>	Photographed	1	0	0	0	3	2	6
	Groups							
<i>Lagenorhynchus obliquidens</i>	Photographed	1	0	0	0	1	0	2
	Groups							
<i>Grampus griseus</i>	Photographed	2	2	1	0	0	2	7
	Groups							
<i>Delphinus delphis</i>	Photographed	5	8	7	7	4	16	47
	Groups							
<i>Stenella coeruleoalba</i> and <i>Delphinus delphis</i>	Photographed	0	4	3	1	2	4	14
<i>Balaenoptera acutorostrata</i>		0	0	4	0	0	1	5
<i>Balaenoptera borealis</i>		0	0	0		1	0	1
	Groups							
<i>Phocoenoides dalli</i>	Photographed	0	0	0	1	0	0	1
	Groups							
<i>Globicephala macrorhynchus</i>	Photographed	0	0	1	0	0	0	1
	Groups							
<i>Delphinus capensis</i>	Photographed	0	0	3	0	0	0	3
	Groups							
<i>Tursiops truncatus</i>	Photographed	1	0	1	0	0	0	2
	Groups							
<i>Berardius bairdii</i>	Photographed	2	1	0	0	0	0	3
TOTAL		30	48	37	39	27	36	217

Table 4. Number of cetacean schools/cetaceans recorded with sonobuoys during CSCAPE 2005 aboard NOAA Ship *David Starr Jordan*.

Species	Recordings
<i>Balaenoptera musculus</i>	12
<i>Orcinus orca</i>	4
<i>Berardius bairdii</i>	1
<i>Balaenoptera physalus</i>	4
<i>Balaenoptera acutorostrata</i>	3
<i>Balaenoptera borealis</i>	2
<i>Lissodelphis borealis</i>	1
<i>Lagenorhynchus obliquidens</i>	1
Total	28

Table 5: Summary of environmental data collected during CSCAPE 2005 aboard NOAA Ship *David Starr Jordan*.

	Leg 2	Leg 3	Leg 4	Leg 5	Leg 6	Leg 7	Total
CTD casts	18	22	15	15	15	22	107
CTD chlorophyll samples	170	220	129	149	136	199	1003
Surface chlorophyll samples	56	66	64	36	36	50	308
Primary productivity samples	91	91	70	76	63	84	475
Nutrient samples	188	242	141	153	150	218	1092
Salinity samples	103	98	81	71	76	92	521
XBT drops	58	75	67	36	38	55	329
Bongo Tows	14	15	16	13	11	14	83